From **FIRSTLIGHT POWER RESOURCES, LLC., MOUNT TOM STATION**
NPDES PERMIT NO. MA0005339 January 2008

Hydraulic Zone of Influence

In order to determine zones of influence and velocity magnitudes for MTS intake and discharges to the Connecticut River, a two-dimensional steady state analysis was prepared. The National Center for Computation Hydroscience and Engineering (NCCHE) computer program NCCHE2D was used, in conjunction with the mesh generator, in computing the zones of influence. The NCCHE2D model is a twodimensional, depth-averaged, unsteady, turbulent flow model with non-uniform and nonequilibrium sediment transport capabilities (Figure 1).

Bathymetric survey data was collected for the breadth of the Connecticut River both upstream and downstream of the CWIS and discharge pipe using a single beam fathometer. The distance of surveyed information was sufficiently separated from the area of study to eliminate any influences from boundary conditions on the upstream, and downstream end. The upstream boundary condition was set as a constant inflow equal to the flow during the day of bathymetric survey, whereas the downstream boundary condition equaled the water levels observed for this river flow. A constant withdrawal and discharge back to the river of 5.84 m^3/s (cubic meters per second) was added at the location of the intakes, and a short diversion wall was added to the discharge. Due to the resolution of the model, the diversion wall was set to match the field conditions as closely as possible while meeting the three-meter grid size. Roughness values for the channel were set to 0.025 (Manning's), and the model was run until it was able to converge on a solution for steady state flows.

Annual Mean and 7Q10 Flow of Connecticut River

In Section 2.3 of the PIC, it was demonstrated that MTS uses less than one percent of the Connecticut River annual mean flow (approximately 9,264 MGD) based upon USGS records of flow from the Montague City, MA gauge (No. 01170500). As reported by EPA in the public notice (June 15, 2007 to July 14, 2007) fact sheet for the draft NPDES permit for the Holyoke Water Pollution Control Facility in Holyoke, MA, the 7Q10 of the Connecticut River in Holyoke is 1,775 cubic feet per second (cfs), or 1,147.2 MGD. The Holyoke Water Pollution Control Facility is located approximately 8.4 miles downstream of the MTS CWIS, and there are no major inputs or outputs between the locations of the two facilities.

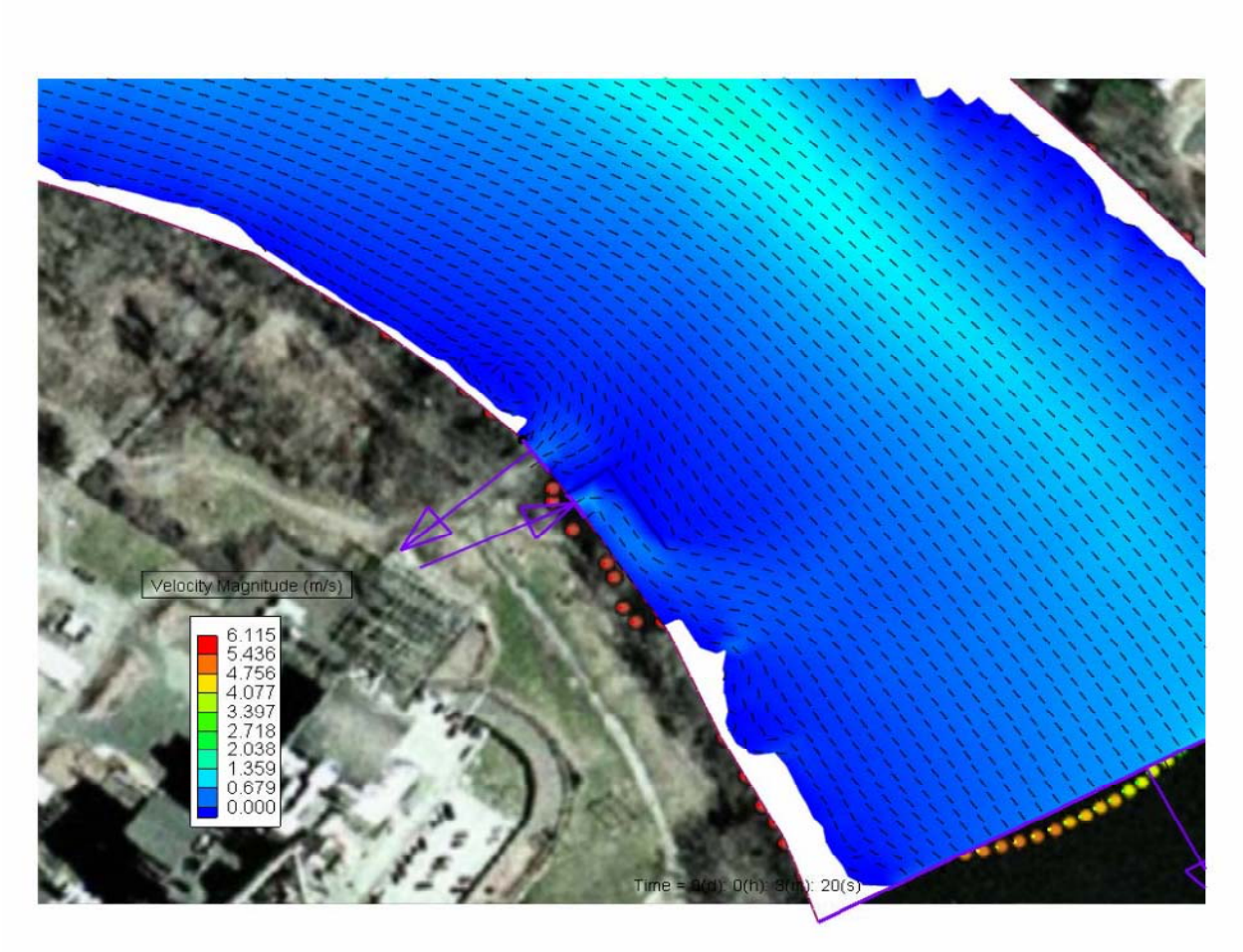

Figure 1. Hydraulic Zone of Influence output for Mount Tom Station. The width of the river in this area is approximately 750 feet.